Voting System Progress Report

and

Tabulation Contingency

and Mitigation Plan

December 31, 2007

Executive Summary

Since February 2006, King County Elections has recommended the purchase of new high-speed, high volume tabulation equipment, a required component in becoming the largest jurisdiction in the nation to conduct all-mail elections. The recommended solution is an upgrade to the existing system and is the solution that provides the best results while limiting the amount of process changes overall, particularly in a presidential-year election. The new equipment is designed for all-mail voting and will streamline mail ballot duplication for better audits and tracking, automate reconciliation, reduce the number of tabulation machines, decrease the possibility of human errors in tabulation, and increase ballot tabulation for election night reporting.

In accordance with Council motion 2007-0402, this plan explores the feasibility, restrictions, and issues of conducting all-mail elections in 2008 using existing tabulation equipment, purchased in 1998, with strategies to mitigate the limitations of the existing ballot counting software and database size. The following strategies were thoroughly analyzed for this report: splitting the election results database, adding more tabulation machines, placing precinct committee officers (PCOs) on a separate ballot, and adding a second tabulation shift.

With the exception of placing PCO candidates on a separate ballot, each of these options can be performed individually to mitigate the database size as part of an emergency contingency plan to prevent data loss and to provide more tabulation capacity. While possible, it is important to highlight that these strategies have never been combined or piloted in a live election, leaving the risks, possible legal implications, and impact to public perception and the perceived accuracy of the vote totals unknown. Possible risks are critically explored within each mitigation strategy section throughout this report.

As requested, this report also contains a progress report on the federal certification process for the recommended Premier Election Solutions (formerly Diebold) Assure 1.2 tabulation system, recommended in the Information Technology Business Case submitted to the Council on March 30, 2007. Premier submitted the first elements of the system to the federal certification process in December 2006, and after several security enhancements and an iterative submittal process is progressing through the certification process. The security enhancements were made following third party reports in the California Top-to-Bottom Review and Florida's Software Review and Security Analysis of the Diebold Voting Machine Software Supplemental Report this past summer.

When investigating the possible mitigation options for transitioning to vote by mail (VBM) with the current equipment released in 1992, two key state statutes must be considered. One law limits the length of time that a ballot may be in King County's possession between the time received and the time tabulated. The second involves the Washington State elections calendar as defined by state law, and gives a deadline for certifying the results of an election. These statutes can be found in Appendix I.

In the past few years King County Elections has made great strides in improving performance and building public trust, confidence and transparency. The Elections section is stronger, has defined and refined its procedures and the office culture has improved as a result of immeasurable work by dedicated employees.

In a thorough analysis of the Council's preferred option of using the current tabulation equipment in a vote-by-mail environment, election officials found this option to be counter effective and of great risk to implement. This untested method puts the cultural improvements, benchmarks and best practices King County Elections has made since 2004 at risk. Use of current equipment and software to conduct a vote-by-mail election would violate several recommendations and directives of the many studies conducted on Elections since 2004.

Motion 2007-0402

This tabulation contingency and mitigation plan is provided to the King County Council in response to Motion 2007-0402:

> *J. By December 31, 2007, the executive shall report to the council on:*
>
> *1. The feasibility of implementing the council's preferred course of action as stated in subsection B of this motion, to conduct all-mail elections in 2008 using current equipment, augmented with additional equipment, security measures, staff and resources. If the executive finds the council's preferred alternative infeasible, the report shall detail the reasons for this conclusion;*
>
> *2. The status of certification, testing and acquisition of new ballot tabulation equipment and software, including the steps taken and planned for ensuring high security standards, accuracy, transparency and staff training; and*
>
> *3. Processes, documentation and procedures for mitigating the limitations of current elections equipment, software and security protocols.*

Status on certification of Premier Elections Solutions tabulation system

The Premier Election Solutions (PES) equipment recommended in the technology business case provided to Council in March 2007 has been used in vote-by-mail elections and census reports in Scotland and Great Britain since 2004. This equipment is currently undergoing the federal certification process in the U.S. The federal certification process has been monitored closely by King County Elections via weekly updates from PES. Earlier this month, elections staff visited Colorado, to observe first-hand, the third-party testing at the SysTest Voting System Test Lab. This third-party test must be submitted to the Election Assistance Commission for final certification. King County is the first county to observe the testing process at this lab. See Appendix II for a power point presentation from SysTest.

Certification

Federal certification was originally expected in October; however, additional security enhancements were made to the Premier system in the September/October timeframe in response to the California and Florida election system security reviews, creating a delay in federal certification until early January. This delay has caused King County Elections to delay the transition schedule.

Although delaying certification, these enhancements and security features further enhance Premier's voting system against security threats and inside attacks, and result in the best and most secure product available and suitable for King County. The new security enhancements create a product that offers the most security features of any other product on the market including: data encryption, multiple factor authentication (password, smartcard and fingerprints), improved reporting and auditing capabilities; and streamlined processes to reduce the possibility for human error.

The certification of the PES Assure 1.2 system is currently scheduled to be completed in early January 2008. A primary component of this process is the completion of the report by a voting system test lab (VSTL), an independent testing laboratory. SysTest, a laboratory based in Denver, Colorado is the testing lab assigned to the Premier system and is currently on schedule to complete the report to the U.S. Elections Assistance Commission by December 31, 2007.

Federal certification by the Election Assistance Commission is required before King County will begin its own rigorous acceptance testing and third party security review. King County Elections is on schedule to receive the federally certified equipment, perform the necessary testing and phase-in the tabulation system in a small special election in May 2008. Full implementation of vote by mail will occur in August 2008.

The testing process for the Assure suite of products began in November 2006 by reviewing software source code and documentation from the vendor against the federal Voluntary Voting System Guidelines. Once any discrepancies are eliminated, a trusted build is created from the source code. In this case, the trusted build was performed by SysTest and observed by PES staff. This tedious process involves running a hash code at different points of the build.

To date, all of the necessary system development and programming has been completed and translated into a final form ready for testing and implementation. Digital signatures developed by the VSTL for the trusted build will be used to authenticate the validity of the application code. These digital signatures will be used by King County in its acceptance testing process and daily operations testing to ensure the validity of the software.

Accuracy testing for the Premier Central Scan System was completed December 14, 2007, and consisted of running 12 batches containing 66 ballots each, covering every possible vote position and scenario on the ballot, more than 1.5 million total. The last stage of the testing process involves functional testing which integrates all components of the PES Assure 1.2 system and tests them against documentation provided by the vendor, including hardware like accessible voting units and additional assistive devices.

Tabulation Upgrade Critical Path

The following diagram outlines a critical path schedule for the implementation, training and testing of the tabulation upgrade that will lead to the use of new equipment in the May 2008 special election. Use of the equipment in a smaller special election is identified as critical by election's staff so that processes and procedures can be refined in advance of the county wide primary and general elections. While adjusted for the new certification time frame the schedule meets the goals originally set for the transition to vote by mail in 2008.

Tabulation Upgrade Critical Path

Jan. 11, 2008
Procurement process completed, contract signed

→

Jan. 21, 2008
Delivery and set up of equipment

→

Feb. 1, 2008
Deadline for federal certification

Process for securing vendor to conduct security review

Sept. 14, 2007
Work order request sent to list

Sept. 28, 2007
Work order responses due

Oct. – Dec. 2007
Evaluation and consultant selected

Jan. 18, 2008
Deadline for signed work order

King County's Acceptance Testing

Initial Employee Training
Completed by **Feb. 8, 2008**

→

Delivery Acceptance
First phase of acceptance testing, completed **Feb. 15, 2008**

→

Mock Election
Second phase of acceptance testing, completed **Feb. 22, 2008**

→

Stress Test
Third phase of acceptance testing, completed **March 7, 2008**

↓

Security Review
Fourth phase of acceptance testing, completed **March 7, 2008**

Election-Specific Deadlines

March 28, 2008
Deadline for systems and equipment testing and operational confidence for use in May 20 special election.

May 20, 2008 special election
First use of equipment in special election to refine operation and process

See Appendix III for a more detailed critical path schedule of the testing and certification process from PES.

Procurement
Contract negotiations with PES, formerly Diebold, are under way and nearly complete. Significant work has been accomplished on the contract language, milestone payments, and the various attachments required by King County Procurement. The contract will also include the acceptance testing previously outlined and submitted to the council in August 2007, Appendix IV, along with significant customer service requirements, standards and evaluation. The contract combines both the warranty and maintenance of two previous contracts as advised by the Prosecuting Attorney's Office: Global Election Management System (purchased in 1998) and accessible voting units (purchased in 2006).

Tabulation security review
Pursuant to motion 2007-0402, a security review of the PES Assure 1.2 voting system will be performed within the parameters of a real-world elections environment in King County. This security review is two-fold and will identify security threats and vulnerabilities along with developing and documenting mitigation strategies to maintain public trust and confidence in the voting system.

A work order was issued in September 2007 to the vendors on the security and privacy master contract list identified by King County's Office of Information Resource Management master contract process. The work order was developed in collaboration with the County's Chief Information Security and Privacy Officer (CISPO), council staff and other IT security professionals in the private and public sector. Elections are working with Council staff, the CISPO and other King County IT professionals to review the one response received to the work order. Appendix V provides the work order distributed to the vendors on the master contract list. The time frames in the security review work order will be updated for the new implementation schedule. Elections anticipate the security review to begin mid-January 2008, once the contracting work is complete and the system receives federal certification.

Mitigation options for VBM using current equipment

In accordance with motion 2007-0402, this plan explores the feasibility and restrictions of conducting all-mail elections in 2008 using current equipment, with strategies to mitigate the database size limitations and processing limitations of the existing system. These strategies include: splitting the database, adding additional tabulation machines, placing precinct committee officers (PCOs) on a separate ballot, and adding a second tabulation shift.

With the exception of placing PCO candidates on a separate ballot, each of these options can be performed individually to mitigate exceeding the database size limitation (maximum size is 2 gigabytes) as part of an emergency, contingency plan to prevent data loss. When combined, there are significant risks, possible legal implications, and substantial impacts to public perception and the perceived accuracy of the results. These risks are critically explored within each mitigation strategy section below.

In exploring the risks associated with some of the mitigating factors, King County Elections relied on best practices established by the national Election Assistance Commission (EAC) where applicable.

Since its inception in 2002, the EAC has been engaged with local elections officials to professionalize the administration of elections across the country. The EAC is an independent, bipartisan commission charged with developing guidance to meet requirements of the Help America Vote Act and establish voluntary voting system guidelines. In addition, the organization commissions and publishes papers on best practices in administering elections. King County Elections regularly monitors, and when possible, implements best practices published by the EAC. A key best practice to consider in implementing new projects was referenced for the purpose of this report.

Election Assistance Commission Best Practice:
Review legal environment, accuracy and transparency

- Vote by mail with current equipment may have potential legal implications in the event of a close race and the certified results are challenged.

- King County uses only certified equipment; however, splitting the database and combining the results outside of a certified system has risks and the lack of an independent stamp of approval may impact the public's trust and the perception of the accuracy of the results.

Splitting the database

To mitigate the potential for exceeding the size limitations of the Microsoft Jet database engine which is used in conjunction with Global Election Management System (GEMS) to report results, it has been suggested by the CEOC and others that the database be split in two and other measures be developed to produce combined results. For several years, King County has had a contingency plan in place to address the possibility of exceeding the database size limitation, a mitigation plan developed to be used as a measure of last resort. In addition to not being considered a best practice in election

administration, this approach may have legal implications and has the vulnerability of being challenged on several fronts.

There are two scenarios of splitting the database. The first scenario envisions splitting the tabulation database in half from the start of tabulation and dividing the ballots to be tabulated into two roughly equal-sized groups. This is the scenario that must be used in a vote-by-mail environment using current equipment to mitigate the database size limitations. The second scenario would envision beginning tabulation with a single database and splitting the database into a second only if the database size exceeds a predetermined threshold. This scenario is our current mitigation plan.

Splitting the database in the beginning of tabulation would require operating under a two database scenario for the entire 15 or 21 day tabulation period, and heightens the potential issues associated with adding and performing quality control checks on millions of lines of results. The mitigation plan, or second scenario, would create the second database only when it exceeds its limitations. Such a scenario presents less risk because it would be managed for only a few days and cause fewer administrative issues in a tight certification window.

Because of the numerous risks involved, King County Elections would prefer to split a database only as a last resort if and when the database size limitation is exceeded as is currently planned for in the mitigation plan. Predicting the ultimate database size in advance is not possible; there are just too many variables involved, some of which cannot be anticipated in advance.

Database size is affected by a number of factors and differs from one election to another based on: the number of precincts, precinct splits, ballot styles, races, and candidates within a particular batch of ballots as well as the voter turnout and the distribution of precincts between batches. Other factors include the pick-a-party primary system, size of font, audio files, and additional Chinese language requirement. While the final database size is important, the transitory peak sizes are cause for concern. When running reports or other processes, temporary tables are created that cause the database size to spike, and this occurrence is expected to cause the database capacity to be exceeded.

Since it is nearly impossible to predict before the election if King County will exceed the capacity limitations, splitting the database from the beginning, as stated in scenario one, would create additional risk and complexity that may not be necessary.

The database capacity first became an issue in 2004, when the legislature changed the primary to a new pick-a-party primary. The change required alterations be made and the tabulation software recertified by the Secretary of State within a six month period of time. In addition to the new primary, the legislature also changed the election date for PCOs from the General Election to the primary, thus adding more than 5,000 new ballot styles. Elections collaborated with PES to analyze the potential growth of the database and develop mitigation strategies given the changes new state laws posed to the aging equipment. In the 2004 primary, larger batches were run to mitigate the database growth. This proved to be a problematic strategy as accountability and accuracy was more difficult to achieve and the larger batches proved to be exceedingly slow.

Technical feasibility of splitting the database
High level procedures involved in splitting the database are explored below. Moderately detailed procedures for this contingency plan can be found in Appendix VI.

Under our current emergency mitigation plan, once the first database reaches a predetermined threshold, it would be saved and a second database would be opened to finish tabulation. Each evening, the results of the two databases would be combined for nightly posting of results. This could be accomplished using the GEMS results export functions of the two databases and then using the web results posting application to calculate combined results, produce a report of combined results, and post to the Web.

While the above process works adequately for nightly results reporting, it provides insufficient detail for many of the other reports produced by King County Elections on the precinct and batch level which are used for daily reconciliation to validate the accuracy of results. Generating these reports requires developing queries that operate on individual tables within the two distinct databases. Several of these queries are complex due the number of tables available, linking between the tables and computations performed by the queries, among other things.

To meet the internal reporting needs, a more involved and complex process is required. The anticipated procedure would involve taking a copy of the two databases and manually deleting a table containing data that is not used for most of the reports. This will require manually modifying unique information in each record, and raises transparency and accuracy concerns. Once the databases are recombined, the majority (but not all) of the reports can be run using current procedures and processes with little modification. This would involve operating outside of the certified system.

There are some reports used internally to facilitate recounts and audits that will not be able to be run from the combined database. These reports will need to be run from each database separately and manually combined.

Risks of splitting the database
While Elections does have emergency contingency procedures in place to manage split tabulation databases, Elections strongly recommends against using split databases.

Although the process of querying two data sources and combining the data into a single final result is not technically difficult, the situation ignores the open and transparent environment in which election officials must operate post-2000 and 2004. Tabulation systems are certified to provide the public, candidates, and political parties with the assurance that results are produced accurately to reflect the will of the voters. Actions taken outside of the certified systems raise suspicion and pose serious public perception risks.

- The Office of the Secretary of State insists that the results of all candidates and races are manually checked to ensure they are accurate and that no vote switching had occurred, as tabulation would occur outside of a certified system. This would mean manually re-calculating 399 results for the 2006 General Election and approximately 7,117[1] results for the 2006 primary, (2,027 if PCO write-in results were not included). Assuming results could be combined and checked at a rate of

[1] Includes 257 “normal” candidates and measures, 1,770 PCO candidates, and 5,110 PCO write-ins.

four per minute, it would take 100 minutes to check the General Election results and 1,020[2] minutes for the primary[3]. These time estimates need to be doubled to account for two-person verification integrity. This process will need to be performed daily after the database has been split before posting results to the Web. This timing assumes there are no errors in the manual computations.

- The above explanation only covers daily cumulative results of total votes per candidate. Other reports, such as the electronic canvass report used to certify the election, involve more detailed information down to the precinct and precinct split level. The 2006 General Election included 1.35 million different results. King County Elections originally believed that each of these results would need to be manually computed as well, but the Secretary of State has indicated that a random sampling should be adequate. King County Elections has discussed a 1 percent audit for each election, or 13,000 result figures. It is unclear whether this would be required for each different report or not.

- Maintaining two databases would have a detrimental impact on administration transparency, with significant concern on the part of observers, candidates, and political parties for use of a process outside the certified system. The use of this system would likely challenge the interpretation that a system developed to combine the results need not be certified. In the event of another razor thin election like the 2004 gubernatorial race, King County Elections believes such a process would be challenged in court.

- Standard daily reports used for manual audits and recounts would require querying two different databases.

- Standard, post-certification results (i.e. results by precinct) provided to candidates, political parties, media and campaigns would be delayed for an unknown period of time. It is doubtful that Elections would be able to meet the Canvassing Board's time frame for the canvass report without prematurely stopping tabulation, which would be illegal. However, continuing tabulation until the statutory end and not producing the required report on time would also be illegal.

Legal implications of splitting the database

When this suggestion was originally introduced the legality of combining results outside of a certified system was questioned. RCW 29A.12.005 defines a "voting system" as *"(1) The total combination of mechanical, electromechanical, or electronic equipment including, but not limited to, the software, firmware, and documentation required to program, control, and support the equipment, that is used :… (c) To report or display election results from the voting system."* Other sections of the RCW require voting systems to be certified.

The possibility of splitting the database has been discussed with the Washington Secretary of State. It was indicated that federal re-certification would not be required. However, because splitting and later recombining databases was never envisioned when GEMS was last certified, it would require additional testing and approval at the

[2] Four per minute for computations and 10 per minute to sight line and determine it's zero for majority of write-ins.
[3] This would assume most of the write-in values would equal zero and not need manual computations, but additional time would still be necessary check each line.

state level. It was also stated that combining results electronically would need to be validated with manual computations for the cumulative results (i.e. the total votes for each candidate or measure). It is not believed that each detailed result (i.e. result figures for each candidate for each precinct or split, as necessary) would be confirmed, but that a sufficient number should be randomly checked.

Organizational impacts of splitting the database
King County Elections does not anticipate the need to increase the number of tabulators in order to make splitting the database feasible. However, additional staff would be required to perform the manual computations required to validate the electronic results. The exact number of additional staff would depend on how quickly results would need to be posted.

As mentioned earlier, using a split database will delay the reporting of information. This is a result of the need for additional quality control efforts as well as the time required to perform the process of combining the databases, a process estimated to require at least two days. This will result in significant delay in the posting of results, particularly if there are any close races or measures.

Recommendation
Although splitting the database is technically feasible, it is not advised as a method to achieve vote by mail in 2008. In addition to the Secretary of State's technical expert concurring in this assessment, every election official (both technical and election management) consulted believes this approach is an inadvisable approach. King County Elections knows of no other jurisdiction that plans on splitting their database as part of its standard operating procedures for managing an election.

Due to changes in Washington State law such as the pick-a-party primary, the change to put PCO candidates on the primary ballot in 2004, and other potential changes in state law, King County will continue to need increasing database size. Also,there is a possibility of exceeding the maximum size of the existing database in the future if a new tabulation application is not implemented.

King County Elections has developed a contingency plan to invoke if necessary but has not planned nor recommended using this contingency as the Council's "Plan B" to achieve the transition to all-mail voting in 2008. It must be emphasized that this plan was developed as a last resort contingency, not as a planned operational process. The best planned alternative to overcome the database size limitation remains the implementation of a new tabulation system that improves the architecture and method of accumulating and reporting results.

Additional tabulation equipment to support greater volume

King County Elections' current tabulation system is 15-year-old technology and has been in operation in King County for nearly 10 years. The equipment was originally designed to operate in a decentralized precinct-based environment (at polling places). King County Elections currently uses the AccuVote equipment at the polls and in a central count environment with the addition of automatic document feeders to process absentee ballots. Precinct-based AccuVotes are used at the polls to tabulate each ballot and the results are stored on a single memory card. The memory card is

removed by Elections staff and the results are uploaded into the secured server and tabulation database on election night. In the central count environment, the AccuVote is used with an automatic feeder to process about 300 ballots an hour. This rate can vary depending on the condition of the ballots, length of the ballot, experience of the tabulator staff and includes the processing time for pulling and delivering batches of ballots. Use of an AccuVote without a feeder would result in the need to individually, hand-insert each ballot into each tabulator. This labor-intensive process would only yield tabulation results at a rate of approximately 100 ballots per hour. Reduced processing capacity and a higher rate of human error can be attributed to hand-inserting ballots one by one.

King County Elections investigated the option of converting polling place AccuVote equipment to accommodate the higher volume of absentee/mail ballots in a vote-by-mail environment. The current central count system contains 40 AccuVotes and the option of adding 40 polling place AccuVotes to the current environment was explored.

Technological possibility of adding tabulation equipment
When King County conducts all elections entirely by mail, the county could technically take advantage of several hundred AccuVotes originally used at the polls. To convert this equipment for use in a central count environment, it would be necessary to replace the existing firmware chips that are designed for precinct counting with new firmware chips programmed for central count.

While the firmware chips may be available for purchase, ballot feeders necessary for processing absentee ballots are no longer manufactured for the aged equipment. Additional feeders are not available from the vendor or any other current market source, nor are spare parts available. Any additional feeders King County has on-hand are used for spare parts, if necessary. Use of an AccuVote without a feeder would result in the need to individually, hand-insert each ballot into the tabulator. This labor-intensive process would yield tabulation results at a substantially slower rate than AccuVote tabulators with feeders. See Appendix VII for a table that illustrates the limited capacity that another 40 tabulators would add.

Risks of adding tabulation equipment
Two significant risks are associated with adding 40 tabulators to the existing tabulation environment. The first is the continued use of equipment that is 10-years-old and desperately in need of replacement. Every mechanical device has a practical life expectancy. The current system has effectively reached that expectancy with more than eight million ballots tabulated since it was originally purchased in 1998. See Appendix VIII for a table illustrating these numbers. Maintenance has become labor and time intensive and availability of parts is limited. While the equipment has served King County's voters well since 1998, it must be replaced.

The second risk focuses on the addition of more staff and equipment; more variables and potential for system errors. Reconciliation is made more difficult by adding a substantial number of machines and operators to the process. This could exponentially increase the chance for errors and impact the accuracy of results. Implementing this strategy would be a step backwards in the progression of increased accountability and transparency that has been achieved since 2004.

Organizational impacts of adding tabulation equipment

Conversion of 40 polling place AccuVotes would require three full days of IT resources and staff for hardware conversion, preventative maintenance, and preparation. An additional three days would be required for testing the set up of the additional tabulation equipment.

The new ballot tabulation room was not designed to hold 40 additional tabulation stations, operators, and support staff. To accommodate this process change, a redesign of the current tabulation area would be required. The additional tabulation space would be required to meet King County Elections' security and observation standards.

In addition to equipment set-up, maintenance, testing and a redesigned tabulation space, additional staff would need to be recruited, hired and trained. This would include adding additional supervisory staff and providing them with sufficient training and experience to adequately oversee this critical operation without errors.

Recommendation

While augmenting the current central count environment with converted polling place AccuVotes is possible, the operational and technical complications and low output of hand-feeding ballots through a tabulator outweigh the desired benefit of increased and more accurate election result reporting; it is not cost effective or time efficient. Using additional tabulators would alleviate some of the volume constraints placed on using the current equipment in a vote-by-mail environment; however, these volume constraints are not of concern with the recommended Premier tabulation equipment.

Placement of precinct committee officer (PCO) candidates on a separate ballot

As mentioned earlier in this plan, database size is affected by a number of factors, including number of precincts, precinct splits, ballot styles, races, and candidates within a particular batch of ballots as well as the voter turnout and the distribution of precincts between batches. The distribution of precincts between batches is almost impossible to predict given ballots returned by voters vary from day-to-day. Other factors include the pick-a-party primary system, size of font and audio files and the Chinese language requirement. As a result, database size will likely be an issue using the current tabulation equipment with a third more absentee ballots counted in a central count environment. King County has more than 2,500 precincts resulting in over 5,000 PCO races, each requiring a unique ballot style.

To reduce the size of the database, King County Elections explored the option of placing PCO races on a separate ballot to reduce the number of races per ballot requiring tabulation.

Technical feasibility of placing PCO candidates on a separate ballot

The placement of PCO races on a separate ballot is a technically possible option with the current tabulation system; however, because of legal intricacies of the current pick-a-party primary, it is not operationally or legally feasible with a consolidated ballot.

Elections' staff explored two different scenarios for this possible mitigation strategy under the assumption that the party preference primary had no impact. With the current pick-a-party primary and consolidated ballot, a separate PCO ballot is not a legal option.

The first option explored was the use of a perforated section of the ballot designated solely for the PCO. Using a perforated section would prove advantageous as it is one less item to insert into the envelope packet, allowing some measure of control assuming the section is not detached when the ballot is returned. The second option explored was the insertion of a second ballot in the envelope packet. This option does not have the advantages of the one ballot design but carries the same deficiencies and process complexities as the first option.

Process complexities of placing PCO candidates on a separate ballot
PCO races are partisan races and can only be counted if the party of the selected PCO candidate matches the party preference selected on the consolidated ballot or if the voter consistently voted for one particular party. Once the PCO ballot is separated from the larger ballot, the link to the party selection is severed with no way to prove that the PCO party selection is valid, as required by primary election laws.

Current laws do not address the process or procedures performed in the event that the party preference on a separate ballot was different. Consultation with the Secretary of State confirms this complexity.

Legal concerns of placing PCO candidates on a separate ballot
The placement of PCO candidates on a separate ballot is allowed pursuant to RCW 29A.40.061 [1] however state laws and administrative code do not contemplate using multiple ballots for operation of the preference primary. Given the legal concerns with this option, further research ceased. In order to use separate ballots for PCO races, research must be conducted on other jurisdictions with similar types of primary systems and separate ballots, legislation must be drafted and implemented into law, procedures written, and a thorough and robust outreach and education plan launched to instruct voters on how to vote using multiple ballots.

In 2008, the U.S. Supreme Court is expected to release an opinion on the challenge to Washington's top two primary system, adopted via the initiative process in 2005. It is possible the court will uphold the people's initiative. This would result in additional changes and complications to yet another new primary system and the presence of PCO candidates would add another layer of complexity unique to King County possibly months before the primary.

Best practices
Due to Washington State's unique primary laws and the large size of King County, best practices in Washington State are not available and best practices outside of the state are difficult to find.

Recommendation
The placement of PCO candidates on a separate ballot is technically possible; however, it is not currently a legal option because of the current pick-a-party primary.

Additional tabulation shifts

The November 2008 General Election promises a high voter turnout, with King County Elections projecting more than 900,000 ballots returned. Historically, return statistics illustrate that nearly half of the total number of ballots will be returned the week of the election[4]. Due to the increased volume of ballots to be processed in a vote-by-mail environment, additional shift work is already planned for the signature verification, opening, and duplication processing phases; however, shift work will not be necessary for tabulation if new equipment is implemented.

King County Elections explored the option of adding a second tabulation shift to accommodate the increased volumes using the current equipment.

Technical feasibility of creating additional tabulation shifts

A second tabulation shift is feasible beginning the day after the election. By law, central count (absentee/mail ballot) tabulation can begin at 7 a.m. on Election Day, with first absentee results posted after the polls close at 8 p.m. In 2008 with an all-mail voting system, memory cards from the accessible voting units used at regional voting centers must be uploaded into the tabulation system and added to the combined election night results. This process involves using the central count software and thus eliminates the possibility of adding a second tabulation shift election night.

The actual production time for each tabulation shift must be six hours. Time must then added at the beginning of each shift for set up, organization, and prior shift reconciliation. The end of each shift requires one to three hours for backing up the database and preparing for and posting results. Reconciliation for each ballot processing stage and after each shift is critical to maintaining accuracy. As mentioned, final reconciliation of the election is complicated by the certification deadline mandated by statute 15 and 21 days after Election Day.

In analyzing historical return data, the second tabulation shift would likely be necessary for five days, Wednesday to Sunday following Election Day, until all ballots available for tabulation can be tabulated in a single shift[5]. Though ballots would continue to trickle in that second week, the volume would be significantly less and not require a second tabulation shift.

Organizational impacts of creating additional tabulation shifts

The estimated total cost to conduct a second tabulation shift is approximately $42,000. This includes 40 tabulators and ten support/lead workers.

Additional tabulation shifts will require additional results postings. It is not legally advised to withhold results, and therefore multiple postings after each shift would be necessary. This will impact the administration staff who are required to approve the release of results and technology staff who must be on-hand to support the tabulation effort and post results. Supervisors and paid party observers remain onsite until each result posting is signed off. Elections' communications team would also be impacted by this and an additional person would be required to be available to respond to questions by the media, candidates and campaigns during the early morning results posting.

[4] See Appendix IX for a table that illustrates the anticipated return and processing of mail ballots.
[5] Pursuant to the table in Appendix IX.

Best practices
King County's current best practice contends that each shift at each stage of processing go through a thorough reconciliation and identify and rectify any inaccuracies. Additional shifts of tabulation staff will require additional reconciliation efforts to occur within the same condensed certification timeframe required by statute. Daily and final reconciliation will be impacted as a result of having less experienced staff in a second shift environment.

Recommendation
While the addition of another tabulation shift is possible, it is not advisable. The economic costs are not significant; however, the stretching of existing human resources needed to manage and support each shift and achieve accurate results is a known risk. The addition of another shift would dilute the pool of experienced tabulators and lead workers to tabulate and perform the reconciliation, leading to a potential decline in the quality of the process and results.

Conclusion

A review of election best practices published by the EAC in their July 2004 report[6] identified 83 practices that pertain to a vote by mail system. Of those 83 best practices, 75 practices are currently being followed by King County Elections. A complete listing can be found in Appendix X.

The strength of going to all-mail voting with the current technology or the proposed upgrade eliminates the need to recruit and hire up to 4,000 poll workers in every countywide election. Fourteen of the 83 best practices relate to poll workers and transitioning to vote by mail removes the applicability of those best practices.

Replacing King County's antiquated tabulation system King County will actually adopt an additional five best practices. Those best practices include:

1. Develop administrative procedures to audit results by batch.
2. Implementing a supplier scorecard to hold vendors accountable for delivering exceptional service and maintaining dependable equipment. This is planned to be part of the contract with the tabulation vendor.
3. Hold regularly scheduled meetings with the vendor to debrief after every major election.
4. Jointly work at complying with ISO 9000 management standards to improve customer service and management practices.
5. Work with vendor to immediately identify and correct any issues and implement corrective or preventive action.

King County Elections professionals have maintained since early 2006 that upgraded tabulation equipment is a system requirement to transition to all-mail voting. Further examination of the four possible mitigation strategies, reaffirm this point. The risks of using a mitigation plan do not outweigh the gains of transitioning to vote by mail using new equipment.

Given the certification process and a December 14 update from the independent testing lab stating that the accuracy test was completed and validated with zero errors, King County Elections is confident that certification is on schedule. However, if certification is not achieved by early February 2008, it is the recommendation of King County's election professionals that the county wait to transition to all-mail voting in 2009.

[6] Available at http://www.eac.gov/election/practices/bpea/bp-welcome?portal_status_message=Changes%20saved